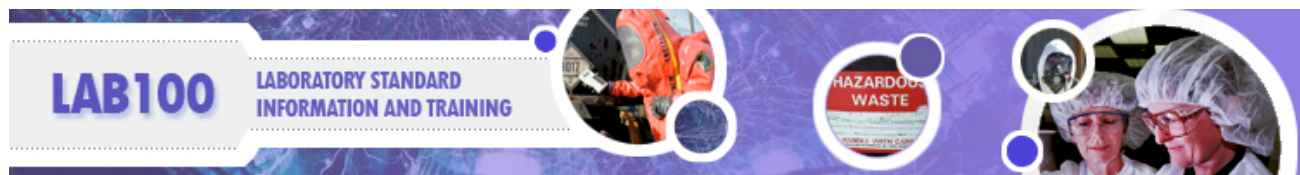


# LAB100

LABORATORY STANDARD  
INFORMATION AND TRAINING



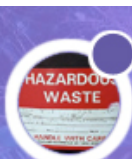


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## Introduction

Welcome to Laboratory Standard Information and Training, LAB100. This training guides you through the requirements of the OSHA Laboratory Standard, provides guidance for managers, and allows for a simplified method of completing your site specific training.

This training applies to Members of the Workforce (employees and contractors) who are engaged in the laboratory use of hazardous chemicals in their work area. The OSHA Standard, 29 CFR 1910.1450, requires that information and training be provided to employees to ensure they are apprised of the hazards of chemicals present in their work area. Employees must be informed of the measures they can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used.

Members of the Workforce must receive this training:

- At the time of their initial assignment to a work area where hazardous chemicals are present.
- Prior to assignments involving new exposure situations

This training course consists of the following modules:

- Module 1** — Basics of Sandia Chemical Safety
- Module 2** — The SNL Corporate Chemical Inventory System & MSDSs
- Module 3** — The SNL Chemical Hygiene Plan
- Module 4** — SNL Emergency Procedures
- Module 5** — Manager's Module
- Module 6** — Next Steps

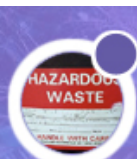
As a manager you are responsible for additional requirements and must complete a Manager's Module.

## How to Get Credit

- Read through the course material.
- Answer all the practice questions, and check your answers.
- Successfully pass this exam with a minimum score of 80%.

Return your completed exam to your Training Coordinator, who will forward it to the Course Manager for grading and entering into TEDs.

You must successfully complete the final exam before receiving your site specific training. Take the site specific training form, LAB103 (attached), to your Manager or Manager-designee to complete the second component of your training. The site specific training must be completed within 30 days of completing this course. Your Training Coordinator will then be responsible for entering your LAB103 completion into TEDS.



## Course Objectives

### Module 1

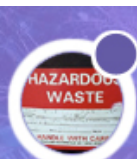
- Recognize Sandia's use of signs to communicate the hazards in your work area
- Recognize health and physical hazards of chemicals and the terms associated with them
- Identify the hazards associated with working with beryllium
- Identify the requirements of chemical labeling
- Identify methods used to detect hazardous chemicals
- Recognize signs and symptoms associated with exposure to hazardous chemicals

### Module 2

- Identify and locate the list of the hazardous chemicals present in your SNL workplace using an identity that is referenced on the appropriate MSDS
- Identify and locate Material Safety Data Sheets (MSDSs) for the hazardous chemicals present in your SNL workplace
- Recognize the sections of the MSDS that are important for your safety whenever you work with a new chemical
- Correctly maintain the CIS when purchasing new chemicals

### Module 3

- Identify and locate Sandia's Chemical Hygiene Plan
- Recognize the additional protective measures that are required for handling particularly hazardous substances
- Define an occupational exposure limit
- Identify the requirements for working with chemicals that are regulated under the OSHA expanded health standards
- Recognize when a Technical Work Document (TWD) is required when working with hazardous chemicals
- Identify the requirements that must be followed when chemicals are developed for another user outside of the Laboratory
- Locate Sandia's Good Laboratory Practices
- Recognize safe handling, storage, and disposal procedures described in your laboratory's TWD

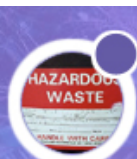


#### Module 4

- Identify the SNL emergency number to call when you need help with a chemical spill
- Identify who to contact when you may have a reportable spill
- Identify the quantity of material that represents a reportable spill
- Identify and locate guidance on hazardous chemicals

#### Module 5

- Recognize your responsibilities in providing employees with information and training on hazardous chemicals in their work area
- Identify the requirements for ensuring exposure limits to hazardous chemicals are controlled
- Identify additional provisions for employees who work with particularly hazardous substances
- Recognize additional provisions for ototoxic chemicals
- Identify your responsibilities concerning labeling, Material Safety Data Sheets, and Technical work documents
- Identify your responsibilities when hazardous chemicals are manufactured, distributed, and imported



## Resources

### ES&H Manual Sections

- **ES&H Manual**  
[https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100\\_rsrcs.htm](https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100_rsrcs.htm)
- **ES&H Manual Glossary**  
[https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100\\_rsrcs.htm](https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100_rsrcs.htm)
- **Chapter 6, Section D, Hazard Communication Standard**  
[https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100\\_rsrcs.htm](https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100_rsrcs.htm)
- **Chapter 6, Section E, Laboratory Standard – Chemical Hygiene Plan**  
[https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100\\_rsrcs.htm](https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100_rsrcs.htm)
- **Chapter 15, Emergency Preparedness and Management**  
[https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100\\_rsrcs.htm](https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100_rsrcs.htm)
- **Chapter 19, Section A, Hazardous Waste Management**  
[https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100\\_rsrcs.htm](https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100_rsrcs.htm)

### Directives and Standards

- **DOE Order 440.1A**  
[https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100\\_rsrcs.htm](https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100_rsrcs.htm)
- **OSHA 1910.1450**  
[https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100\\_rsrcs.htm](https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100_rsrcs.htm)

### Contacts

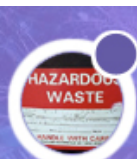
- **Division ES&H Homepage**  
[https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100\\_rsrcs.htm](https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100_rsrcs.htm)
- **Fire Protection contact**  
[https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100\\_rsrcs.htm](https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100_rsrcs.htm)

### Helpful Links and Websites

- **Sandia Good Laboratory Practices**  
[https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100\\_rsrcs.htm](https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100_rsrcs.htm)
- **Chemical Information System (CIS)**  
[https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100\\_rsrcs.htm](https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100_rsrcs.htm)
- **Chemical Information System (CIS) Program**  
[https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100\\_rsrcs.htm](https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100_rsrcs.htm)
- **MSDS Library**  
[https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100\\_rsrcs.htm](https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100_rsrcs.htm)
- **Annual Report on Carcinogens National Toxicology Program**  
[https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100\\_rsrcs.htm](https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100_rsrcs.htm)



- **Occupational Health & Safety Administration (OSHA)**  
[https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100\\_rsrcs.htm](https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100_rsrcs.htm)
- **National Fire Protection Association (NFPA)**  
[https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100\\_rsrcs.htm](https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100_rsrcs.htm)
- **American Conference of Governmental Industrial Hygienists (ACGIH)**  
[https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100\\_rsrcs.htm](https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100_rsrcs.htm)
- **National Fire Protection Association (NFPA) 704 Hazardous Materials Classification symbol**  
[https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100\\_rsrcs.htm](https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100_rsrcs.htm)
- **TEDS EveryOne**  
[https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100\\_rsrcs.htm](https://hrprod.sandia.gov/cfdocs/hris/OLGA/LAB100/lab100_rsrcs.htm)



## Module 01 Basics of Sandia Chemical Safety

Training is required if Members of the Workforce engage in activities that involve potential exposure to hazardous chemicals. OSHA requires training in either Laboratory Standard or Hazard Communication.

Sandia National Laboratory has additional health and safety standards - including requirements from DOE Order 440.1A - that are found in the Sandia Environmental Safety & Health (ES&H) Manual.

Access the ES&H Manual using the link on the right - and bookmark it in your web-browser. As we work through the modules of this training we will also suggest bookmarking 'chapters' of the ES&H Manual for your future reference. You can also access the ES&H Manual Glossary. In this training the first time a term is presented you can click it and get the definition from the Glossary.



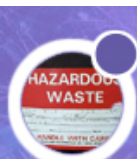
Upon completion of this module you will be able to...

- Recognize Sandia's use of signs to communicate the hazards in your work area
- Recognize health and physical hazards of chemicals and the terms associated with them
- Identify the hazards associated with working with beryllium
- Identify the requirements of chemical labeling
- Identify methods used to detect hazardous chemicals
- Recognize signs and symptoms associated with exposure to hazardous chemicals

### ***Working with Hazards***

As a member of the Sandia Workforce you will be informed of hazards in your work area. When you begin working in a new area be sure to read and understand all posted signs and placards. If you have questions ask your manager for help.

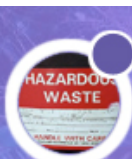
- SNL uses signage to inform Members of the Workforce of hazardous chemicals or other hazards in the work area. The Sandia Workplace Hazard Awareness System (SWHAS) is used at all Sandia sites except the CA site, where the Integrated Safety Management System (ISMS) Hazard Notice is used.
  - Each SWHAS sign must include the owner of the area, their work location, their emergency contact phone numbers, and the National Fire



Protection Association (NFPA) 704 Hazardous Materials Classification symbol.

- The NFPA symbol is placed in the upper left-hand corner of the SWHAS sign. The numbers on the National Fire Protection Association 704 Hazardous Materials Classification symbol represent the degree of severity with respect to health, fire hazard and reactivity that an emergency response member would face upon entry into the area as well as general awareness to anyone entering the area.

The white area beneath the Specific Hazard area is used to identify unusual hazards such as reactivity with water, or oxidizers. The numbers/symbols should be derived from material safety data sheets (MSDSs) for most of the hazardous chemicals in the area.


**BLUE HEALTH HAZARD**

<b>4</b>	Deadly
<b>3</b>	Extreme danger
<b>2</b>	Hazardous
<b>1</b>	Slightly hazardous
<b>0</b>	Normal Material

**RED FIRE HAZARD (F)**
**FLASH POINTS:**

<b>4</b>	Below 73
<b>3</b>	Below 100
<b>2</b>	Below 200
<b>1</b>	Above 200
<b>0</b>	Will Not Burn

**WHITE SPECIFIC HAZARD**

<b>OX</b>	Oxidizer
<b>W</b>	Use NO WATER

**YELLOW REACTIVITY**

<b>4</b>	May Detonate
<b>3</b>	Shock or Heat May Detonate
<b>2</b>	Violent Chemical Change
<b>1</b>	Unstable if Heated
<b>0</b>	Stable



For aid in determining the appropriate numerical rating and specific hazards, contact the appropriate SNL Division CST or the fire protection contact. Use the links on the right to find your CST and fire protection contact.

SNL/CA posts an ISMS Hazard Notice to effectively communicate the physical and health hazards that are present within a lab or work space, or are associated with a process or activity.



## NOTICE

The following **hazards** are present in Building \_\_\_\_\_ /Rm. \_\_\_\_\_

<input checked="" type="checkbox"/> Designated Area For Carcinogens, Acutely Toxic & Reproductive Hazard	<input checked="" type="checkbox"/> Flammable Liquid (20% or less)	<input checked="" type="checkbox"/> High Pressure (1000 psi or less)	<input type="checkbox"/> Other (List): _____
<input checked="" type="checkbox"/> Reactive Gases (2.0 or less)	<input checked="" type="checkbox"/> High Noise (120 dBA)	<input type="checkbox"/> Other (List): _____	<input type="checkbox"/> Other (List): _____

**Personal Protective Equipment (PPE) and Precautions:**

<input checked="" type="checkbox"/> Safety Glasses Required for Entry	<input checked="" type="checkbox"/> Hearing Protection Required For Entry <input checked="" type="checkbox"/> When Equipment is in Use	<input checked="" type="checkbox"/> No Eating or Drinking	<input type="checkbox"/> Other (List): _____
--	---	--	---

Applicable OSHA Standard: ☒ Lab Standard ☐ Hazardous Communication

Space Owner: \_\_\_\_\_

Alternate: \_\_\_\_\_

ES&H Hotline: 911  
ES&H Hotline: 4-3724

To update this sign, contact your ES&H Coordinator for assistance.

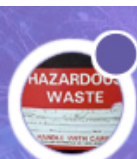
- The sign must indicate both the physical and health hazards of the location
- The sign must indicate the necessary Personal Protective Equipment (PPE) or special precautions required for entry
- CA does not post the 704 as part of the ISMS hazard notice, but as a separate posting, such as the UNO fire division symbol for explosive. The sign used in CA is 10" x 14" with an NFPA diamond 5"x 5" with 1 1/2" (H) numbers. The purpose is to allow the responder to safely identify the hazards at a point of 50 ft or 33 meters.

At all SNL locations some hazards have very specific regulatory sign requirements which require their own signage and may not be communicated on the SWHAS or ISMS Hazard Notice. Some of these hazards are radiation, lasers, and explosives. Refer to the ES&H Manual or the subject matter expert on your Division CST.

### Understanding Hazards

It's important for Members of the Sandia Workforce to understand the hazards that can be present when working with chemicals. OSHA requires that you are informed about the health and physical hazards of the chemicals in your workplace.

- Health hazards may cause measurable changes in the body, such as decreased lung function. The changes in the body are generally indicated by the occurrence of signs and symptoms such as shortness of breath.
  - Acute health effects usually occur rapidly as a result of short-term exposures such as asphyxiation from carbon monoxide.
  - Chronic effects generally occur as a result of long-term exposure. An example of a chronic effect is cancer.



- A physical hazard means a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive.

### ***Hazard Terms***

Certain terms are used in recognizing the hazards that chemicals can present. In your work at Sandia you need to know these terms so you are aware of the hazards of the chemicals we work with. The following terms are required by the OSHA Hazard Communication Standard to describe the health hazards of chemicals:

#### **Carcinogens:**

A chemical is considered to be a carcinogen by OSHA if:

It has been evaluated by the International Agency for Research on Cancer (IARC), and found to be a carcinogen or potential carcinogen; or

It is listed as a carcinogen or potential carcinogen in the Annual Report on Carcinogens published by the National Toxicology Program (NTP) (latest edition); or

It is regulated by OSHA as a carcinogen

OSHA currently regulates and lists chemical substances as carcinogens or potential carcinogens in the OSHA regulation, 29 Code of Federal Regulations, 1910, Subpart Z. Some of these chemical substances that may be found at SNL are:

- |                  |                      |
|------------------|----------------------|
| • Asbestos       | • Inorganic arsenic  |
| • Benzidine      | • Methylenedianiline |
| • Benzene        | • Methylene Chloride |
| • Cadmium        | • Vinyl chloride     |
| • Ethylene oxide | • 1,3-Butadiene      |
| • Formaldehyde   |                      |

For a complete list of OSHA carcinogens and potential carcinogens visit the US Department of Labor OSHA Standards web page.

#### **Corrosives:**

A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the site of contact.

- Examples of corrosives are acids and bases such as hydrofluoric acid or sodium hydroxide.

#### **Irritants:**

A chemical, which is not corrosive, but which causes a reversible inflammatory effect on living tissue by chemical action at the site of contact.



- The site of contact may be the skin or the eyes.
- Aluminum oxide is an irritant commonly used at SNL.

**Sensitizers:**

A chemical that causes a substantial proportion of exposed people or animals to develop an allergic reaction in normal tissue after repeated exposure to the chemical.

- Epoxies are an example of a sensitizer commonly used at SNL.

**Toxic:**

A chemical that is a toxin or “toxic” is likely to cause death or serious physical harm to the entire body or to an organ system in the body such as the nervous system.

- The toxic chemical may be absorbed either through ingestion, inhalation, or body (skin or eye) contact.
- An example would be arsenic.

**Highly Toxic:**

A chemical that has a lethal effect (causes death) at very low concentrations, either through ingestion, inhalation, or by body (skin or eye) contact.

- An example would be the nerve gas sarin.

**Target Organ:**

As defined in Casarett and Doull's Toxicology, The Basic Science of Poisons, "Most chemicals that produce systemic toxicity do not cause a similar degree of toxicity in all organs but usually produce the major toxicity to one or two organs. These are referred to as target organs of toxicity for that chemical." The following is a target organ categorization of health effects which may occur, including examples of signs and symptoms and chemicals common at SNL which have been found to cause such effects.

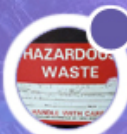
Hepatotoxins: Chemicals which produce liver damage

- Signs & Symptoms: Jaundice; liver enlargement
- Chemicals: Carbon tetrachloride; methylenedianiline

Nephrotoxins: Chemicals which produce kidney damage

- Signs & Symptoms: Edema (swelling); protein in the urine
- Chemicals: Halogenated hydrocarbons; uranium

Neurotoxins: Chemicals which produce their primary toxic effects on the nervous system



- Signs & Symptoms: Narcosis; behavioral changes; decrease in motor functions
- Chemicals: Mercury; carbon disulfide

Agents which act on the blood or hemato-poietic system and deprive the body tissues of oxygen

- Signs & Symptoms: Cyanosis; loss of consciousness
- Chemicals: Carbon monoxide; hydrogen cyanide

Agents which damage the lung: Chemicals which irritate or damage lung tissue

- Signs & Symptoms: Cough; tightness in chest; shortness of breath
- Chemicals: Silica; asbestos, beryllium

### **Reproductive toxins:**

Chemicals which affect the reproductive capabilities including chromosomal damage (mutations) and effects on fetuses (teratogenesis)

- Signs & Symptoms: Birth defects; sterility
- Chemicals: Lead; cellusolve acetate (Glycol ether acetates)

### **Cutaneous hazards:**

Chemicals which affect the dermal layer of the body

- Signs & Symptoms: Defatting of the skin; rashes; irritation
- Chemicals: Ketones; alcohols

### **Eye hazards:**

Chemicals which affect the eye or visual capacity

- Signs & Symptoms: Conjunctivitis; corneal damage
- Chemicals: Organic solvents; acids

### **Ototoxic Chemicals:**

Chemical substances identified by the American Conference of Governmental Industrial Hygienists (ACGIH) that have the potential to produce hearing loss or other adverse effects on organs or nerves involved in hearing or balance.

Beryllium is a lightweight, strong metal that has applications in aerospace and weapons production. It may be found at SNL in a pure form or as a metal alloy.

- Exposure to beryllium through inhalation can cause a serious illness in certain people. This illness, called chronic beryllium disease or CBD, may cause an irreversible and sometimes fatal scarring of the lungs.



- While CBD is primarily a lung disease, it may also affect other organs, particularly the lymph nodes, skin, spleen, liver, kidneys, and heart.
- Skin effects (lesions, ulcerations, wart-like bumps) may also develop if beryllium penetrates into cuts or scratches. Beryllium particles must be removed from a wound for proper healing.
- Beryllium is categorized as a human carcinogen.
- Exposure to beryllium at SNL is controlled through the Department of Energy regulation 10 Code of Federal Regulations (CFR) 850.

Members of the Workforce who work at a site where beryllium activities are conducted are required to complete Beryllium Awareness Training (BEA100) and may be required to complete Beryllium Associated Workers Training (BEA101).

### ***Chemical Labeling***

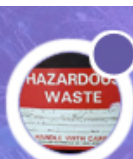
Labeling chemical containers is critical to safely working with them. When you work with chemicals take time to read the label carefully before beginning your work.

- The warning label must include appropriate hazard warnings regarding the physical and health hazards of the chemical substance.
- The label must identify all hazardous chemicals in the container.

Labels are **not** required on portable containers into which hazardous chemicals are transferred from labeled containers, if the portable container is intended for immediate use by Members of the Workforce performing the transfer.

Unlabeled portable containers must never be left unattended.

- The manufacturer or distributor should include on the label the manufacturer's name, address, and emergency telephone number. Contact your Division Industrial Hygienist if this information is not present on the label of a chemical substance.
- Warning labels may contain written warnings such as "carcinogen" or may use symbols or pictures such as the following:



## Hazardous Materials Identification System (HMIS) Labeling System

Name of Material

	<b>HEALTH</b>
	<b>FLAMMABILITY</b>
	<b>REACTIVITY</b>
	<b>PROTECTIVE EQUIPMENT</b>

- The blue, red, and yellow colored bars indicate, respectively, the health, flammability, and reactivity hazard associated with the material.
- These three bars use a numbering scale ranging from 0 to 4. A value of zero means that the material poses essentially no hazard; a rating of four indicates extreme danger.

## National Fire Protection Association Diamond symbol (NFPA)

- The hazard identification signal is a color-coded array of four numbers or letters arranged in a diamond shape.
- The blue, red, and yellow fields (health, flammability, and reactivity) all use a numbering scale ranging from 0 to 4. The white area is used to identify unusual hazards such as reactivity with water or oxidizers.
- A value of zero means that the material poses essentially no hazard; a rating of four indicates extreme danger.



- Labels or other forms of warning must be legible, in English, and prominently displayed on the container. Information in other languages may be added as long as the information is presented in English as well.
- Any significant new information regarding the hazards of a chemical must be added to the label for the chemical within three months of becoming aware of the new information.



- Existing labels on incoming containers of hazardous chemicals must not be removed or defaced, unless the container is immediately marked with the required information.

Warning labels let the worker know what kind of hazards are present. With a few exceptions, labels, tags, or warning markers are required on all containers of hazardous materials in the workplace, and on all containers being transported from one location to another.

### ***Detecting Hazardous Chemicals***

The ability to detect the release or presence of hazardous chemicals is important to safely working with them. OSHA requires that you are informed of methods that may be used to detect the presence or release of hazardous chemicals.

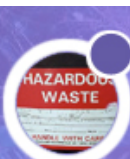
These methods include:

- **Odor:** Some chemicals are vaporized into the air easily and emit a strong odor.
  - Example: solvents such as isoamyl acetate which smells like bananas
  - **Note:** Odor is not necessarily directly related to the toxicity of a chemical.
- **Visual Appearance:** Release of some chemicals may be observed by the visible appearance of the chemical, such as color.
- **Air monitoring:** In areas where highly toxic substances are present, there may be air monitoring devices that alarm when the concentration of the substances reaches a certain value, such as 50% of the exposure limit.
  - Example: arsine air monitors

### ***Chemical Exposure Signs & Symptoms***

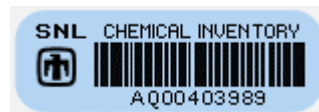
Members of the SNL Workforce should be familiar with the physical and health hazards and the signs and symptoms of exposure associated with the chemicals they use.

- Signs and symptoms that could be related to chemical exposure are headache, drowsiness, coughing, jaundice, nausea, or a rash on contact with a chemical.
- Associated material safety data sheets (MSDSs) or other reference material should be reviewed for specific hazards
- If you think you have been exposed to a chemical substance, contact your manager.



## Module 02 SNL Corporate Chemical Inventory System & MSDSs

The Chemical Information System (CIS) is a web-based integrated chemical inventory and Material Safety Data Sheet (MSDS) document management system. The CIS project tracks the SNL chemical inventory by Sandia applied barcodes on individual chemical containers, including gas cylinders.



Information such as the chemical or product name, location, quantity, and information about who is responsible for the chemical is managed in the CIS database. The CIS is implemented for the New Mexico, California, and Nevada sites.

In addition to chemical inventory data, the CIS stores Material Safety Data Sheets (MSDSs) for the tracked chemicals. The MSDS library in the CIS currently contains over 80,000 MSDSs. The MSDS Library is available on Sandia's Internal Web 24 hours a day, seven days a week. New MSDSs are continually added to the library for chemicals used on site and as requested. Access the CIS now from the link on the right and 'bookmark' it in your web-browser.



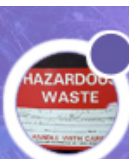
Upon completion of this module you will be able to:

- Identify and locate the list of the hazardous chemicals present in your SNL workplace using an identity that is referenced on the appropriate MSDS
- Identify and locate Material Safety Data Sheets (MSDSs) for the hazardous chemicals present in your SNL workplace
- Recognize the sections of the MSDS that are important for your safety whenever you work with a new chemical
- Correctly maintain the CIS when purchasing new chemicals

### ***CIS Drivers***

The primary drivers for the CIS program are derived from state and federal regulations, among them the Emergency Planning and Community Right-to-Know Act (EPCRA) and the Occupational Safety and Health Act (OSHA). These and other regulatory drivers determine the nature and type of chemicals tracked by the CIS program. Please see the CIS Program Plan for more information.

- The CIS fulfills the requirements of the OSHA Hazard Communication Standard of maintaining a list of the hazardous chemicals present in the workplace using an identity that is referenced on the appropriate MSDS.
- The CIS electronic inventory helps chemical users and their managers to assess and manage workplace hazards and is readily accessible.



- Hardcopies of MSDSs may be kept in the workplace as a backup source, but must be kept current with the workplace inventory and regulatory changes.
- The advantage of the CIS system is that it automatically updates MSDSs with current inventory and regulatory standards.

### ***Material Safety Data Sheets (MSDSs)***

MSDSs are always available on the SNL internal web and you should consult them before working with any new chemical.

CIS can be accessed off-site for MSDS purposes by using the following link:  
<https://webprod.sandia.gov/CIS/svRemoteStartup>

Contact your industrial hygienist if you have questions about MSDSs.

Members of the Workforce at Sandia are encouraged to use the MSDS sheets that are available on-line in the SNL CIS to ensure the most accurate chemical information.

Whenever you are working with hazardous chemicals always check the MSDS **before** you begin working.

Per the OSHA Hazard Communication standard, the MSDS is required to cover 12 areas, but manufacturers and distributors may include as many as 16 sections.

- Section I contains the name of the chemical and similar chemicals with different names, the preparation or latest revision date and the manufacturer's name-address-phone number for emergencies.
- Section II contains the list of components in the chemical which are health or physical hazards and controls of the components, exposure limits such as the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) and OSHA Permissible Exposure Limits (PELs), the STELs (Short Term Exposure Limits), and ceiling exposure limits, if applicable.
- Section III is an emergency overview. It contains the potential health hazards, how the chemical enters the body, and the signs and symptoms of exposure to the chemical. Always check Section III when working with a new chemical.

The First Aid section of a MSDS describes the measures that may be taken when Members of the Workforce are exposed to a hazardous chemical.

The Fire Fighting section of a MSDS describes the fire hazards of the chemical substance, such as the flammable or explosive limits.



The upper and lower flammable or explosive limits of a chemical substance indicate the likelihood that a chemical substance may ignite under the appropriate environmental conditions.

- Section VI covers containment of accidental spills and leaks, recommended personal protective equipment (PPE), and proper emergency response to a release of this particular chemical.
- Section VII covers safe handling and storage, and recommended storage conditions.

The Exposure Controls section of a MSDS describes the protective measures that can be taken to ensure that Members of the Workforce are not exposed to chemicals above published exposure limits.

- Section IX covers physical and chemical properties of the chemical substance such as the evaporation rate and the boiling point.
- Section X lists the incompatibilities of the chemical, its stability and reactivity, and its decomposition and hazardous by-products.
- Section XI contains the toxicological information on the chemical.
- Section XII contains the ecological effects information on the chemical.
- Sections XIII through XVI cover other regulatory requirements governing the proper disposal, shipping and any other state or federal regulations or information regarding the chemical.

### ***Keeping the CIS Current***

Remember, the CIS satisfies the requirements of the OSHA Hazard Communication Standard by maintaining a list of the hazardous chemicals present in the workplace.

- At SNL/NM, chemical substances should be purchased through the SNL Just-in-Time (JIT) chemical supplier. The JIT system automatically affixes a tracking barcode label to the chemical container so that the chemical is immediately entered into the SNL inventory with an appropriate MSDS. If at anytime a chemical container needs a barcode label, call the CIS/NM Helpline at 844-MSDS for barcoding service and other CIS related questions.
- At SNL/CA, the Hazardous Material Management team affixes a tracking barcode label to the chemical container in the on-site receiving process so that the chemical is promptly entered into the SNL inventory with an appropriate MSDS. If at anytime a chemical container needs a barcode label, call the CIS/CA Helpline 294-MSDS for barcoding service and other CIS related questions.



**Note:** Refer to the requirements in Chapter 6U of the SNL ES&H Manual, *Chemical Barcoding and Inventory*, when transferring or removing barcoded chemicals in the CIS inventory.

### ***Your Site-Specific Training***

Before you work with hazardous chemicals at Sandia, you must complete this online training followed by site-specific training from your manager.

During your site-specific Lab Standard training, your manager is responsible for training you on the location and use of the SNL CIS and the MSDSs for your specific work area.



## Module 03 The SNL Chemical Hygiene Plan

As mandated by DOE Order 440.1A, work with hazards at all Sandia locations must comply with Occupational Safety & Health Administration (OSHA) regulations and standards.



OSHA's mission is to assure the safety and health of America's workers by setting and enforcing standards; providing training, outreach, and education; establishing partnerships; and encouraging continual improvement in workplace safety and health.

This module focuses on the OSHA Laboratory Standard 29 Code of Federal Regulations (CFR) 1910.1450.

Upon completion of this module you will be able to:

- Identify and locate Sandia's Chemical Hygiene Plan
- Recognize the additional protective measures that are required for handling particularly hazardous substances
- Define an occupational exposure limit
- Identify the requirements for working with chemicals that are regulated under the OSHA expanded health standards
- Recognize that a Technical Work Document (TWD) is required when working with hazardous chemicals
- Identify the requirements that must be followed when chemicals are developed for another user outside of the Laboratory
- Locate the National Research Council's Good Laboratory Practices
- Recognize safe handling, storage, and disposal procedures described in your laboratory's TWD

### *The Chemical Hygiene Plan*

OSHA requires that a written Chemical Hygiene Plan (CHP) is developed for workplaces where Members of the Workforce engage in the [laboratory use of hazardous chemicals](#). Sandia's CHP is Chapter 6E of the ES&H Manual. Access the CHP using the link on the right and bookmark it on your web-browser.

- OSHA requires that the CHP include provisions for information and training. For example, Members of the Workforce must be informed of the location and availability of:
  - The Chemical Hygiene Plan (CHP)
  - The contents of the OSHA Laboratory Standard
  - The known reference materials on the:
    - Safe handling of hazardous chemicals



- Storage and disposal of hazardous chemicals

**NOTE:** These reference materials may be in the form of material safety data sheets (MSDSs)

- Members of the Workforce must also be informed of:
  - The permissible exposure limits for OSHA regulated substances or recommended exposure limits for other hazardous chemicals such as those published by the American Conference of Governmental Industrial Hygienists.
  - The signs and symptoms associated with exposures to hazardous chemicals used in the laboratory.

### ***The Chemical Hygiene Plan Requirements***

- Members of the Workforce also must be trained in:
  - Methods and observations that may be used to detect the presence or release of a hazardous chemical (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released)
  - The physical and health hazards of chemicals in the work area
  - The measure employees can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used.
- The information and training must be provided at the time of the initial assignment and prior to assignments involving new exposure situations.

OSHA requires that the CHP must include the following:

- Standard operating procedures when laboratory work involves the use of hazardous chemicals. At SNL these procedures are referred to as technical work documents (TWDs) and are usually activity or laboratory-specific.
- Specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals in the laboratory. Examples are:
  - Appropriate work practices
  - Engineering controls, such as local exhaust ventilation
  - Personal protective equipment such as gloves, safety glasses, and lab aprons



- The CHP must designate a Chemical Hygiene Officer. At SNL, the Chemical Hygiene Officer is the owner of the Laboratory Standard Program, Chapter 6E in the ES&H Manual.
- Managers are required to review and approve laboratory operations, procedures, or activities whenever a new chemical or change in process is introduced which creates a potential health hazard to Members of the Workforce.
- Managers are responsible for ensuring that measures are taken to ensure the proper and adequate performance of fume hoods. At SNL, fume hood performance is certified annually.
- Provisions for medical consultation and medical examinations
- Provisions for additional protection for Members of the Workforce working with particularly hazardous substances. Particularly hazardous substances are [select carcinogens](#), [reproductive toxins](#), and substances which have a high degree of [acute toxicity](#). Additional protective measures for these substances must include:
  - Signage designating the area where they are handled,
  - Use of containment devices such as fume hoods or glove boxes,
  - Procedures for the safe removal of contaminated waste, and
  - Decontamination procedures.

### ***Use of Respirators***

Where the use of respirators is necessary to maintain exposure below occupational exposure limits, SNL managers are responsible for providing the proper respiratory protection. The respirators shall be selected and used in accordance with the OSHA respiratory protection standard. Contact your Division CST industrial hygienist for evaluating potential airborne chemical hazards and selection of the appropriate respiratory protection.

### ***Occupational Exposure Limits***

The Laboratory Standard requires that managers ensure that Members of the Workforce exposure to chemical substances regulated by OSHA does not exceed occupational exposure limits. An occupational exposure limit (OEL) is a generic term used to represent the concentration of a chemical that is allowable over a specific period of time such as an eight hour work day.

- SNL industrial hygienists monitor the concentration of chemicals in the air and compare the results to the OEL for the specific chemical. Some monitoring may be averaged over a 15 minute time period (a short term exposure limit) or an instantaneous exposure (a ceiling concentration). These concentrations usually are expressed as milligrams of chemical



substance per cubic meter of air, or parts of chemical substance per million parts of air (ppm).

- Generally, OELs may be regulatory such as the Permissible Exposure Limits (PELs) promulgated by OSHA, or authoritative such as those published by non-regulatory organization such as the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs).
- DOE Order 440.1A requires that Members of the Workforce exposure to hazardous substances is controlled such that they do not exceed the OSHA PELs or the ACGIH TLVs, whichever is more protective.
- At SNL, the occupational exposure limit for beryllium is regulated by the DOE Beryllium Standard (10CFR 850).
- Potential exposure to OSHA-regulated substances through eye and skin contact is prohibited.

### ***Technical Work Documents (TWDs)***

Sandia uses Technical Work Documents (TWDs) like SOPs and OPs that describe safety and health considerations when laboratory work involves the use of hazardous chemicals, including particularly hazardous substances.

- Your manager will tell you what TWDs are used in your laboratory during your site-specific training. Make sure you read and understand the TWDs used in your lab.
- SNL Members of the workforce may do one of the following:
  - Use current TWDs as long as the reasonably anticipated hazards and controls are addressed
  - Develop and implement new TWDs that meet the minimum requirements stated in Section 6E — Sandia ES&H Manual. For more information access the link on the right.
    - Contact your CST and your ES&H Coordinator for assistance if you develop and implement new TWDs.

### ***Developing Hazardous Chemicals in the Laboratory***

Your manager is responsible for ensuring that Members of the Workforce comply with the requirements of the OSHA Hazard Communication Standard when chemicals are developed for another user outside of the laboratory.

- These requirements include the preparation of material safety data sheets (MSDSs) and labeling
- Contact your manager and your ES&H Coordinator for assistance in complying with the Hazard Communication Standard if a chemical is developed for another user outside of the laboratory



### ***Good Laboratory Practices***

Members of the workforce should follow good laboratory practices when working with hazardous chemicals. The National Research Council's (NRC) Good Laboratory Practices gives you some basics on personal protective equipment (PPE), local exhaust ventilation (LEV), and safe work practices.

- Access the NRC Good Laboratory Practices using the link on the right and bookmark it in your browser.
- Print the NRC Good Laboratory Practices for your future reference.

### ***Safe handling, storage, and disposal***

To ensure safe handling of chemicals, follow the procedures as listed in your laboratory's technical work documents (TWDs) and in Good Laboratory Practices. Consult your manager if you are unsure of the hazards or the precautions to take with any of the chemicals in your work area.

Your laboratory's TWDs will include specific procedures to protect you from exposure to hazardous chemicals. Utilizing appropriate work practices, engineering controls, and personal protective equipment will ensure safe handling practices are conducted in the laboratory.

- Wear appropriate gloves and eye protection or other personal protective equipment as recommended by your Division Customer Support Team (CST) industrial hygienist.
- Consult your Division CST industrial hygienist regarding the appropriate local exhaust ventilation to protect you from chemical inhalation hazards in the laboratory.
- Check all lab equipment to make sure it is operating safely.
- If possible, try not to work alone when using hazardous chemicals. Follow your department's policy on working alone.

Keep work area clean and organized. Store chemicals properly when not in use and at the end of the workday.

Check your laboratory's TWDs for specific storage information. Always use the recommended storage for hazardous chemicals.

- Segregate flammable and combustible, toxic, and corrosive or oxidizing chemicals in storage areas
- Equip storage areas with temperature controls if chemicals have to be stored at specific temperatures
- Keep the number of chemicals in the lab to a minimum and dispose of expired chemicals



- Store chemicals in well-ventilated cabinets and away from direct sunlight
- Make sure the storage area is free from ignition sources
- Never store chemicals in fume hoods

Members of the workforce must ensure proper disposal of chemicals. Refer to your Division CST Environmental Protection representative for procedures for the safe disposal of chemicals.

- Chemicals should never be poured down sinks or floor drains
- Disposal container's labeling and procedures must follow the requirements in the SNL ES&H Manual Chapter 19, Waste Management

**Note:** Upon transfer or leaving Sandia employment, laboratory workers shall arrange for the disposal or transfer of all chemicals for which they are responsible.



## Module 04 SNL Emergency Procedures

The OSHA Lab Standard requires that Members of the Workforce are trained in measures they can take to protect themselves from exposure to hazardous chemicals, including emergency procedures.

Upon completion of this module you will be able to:

- Identify the SNL emergency number to call when you need help with a chemical spill
- Identify who to contact when you may have a reportable spill
- Identify the quantity of material that represents a reportable spill
- Identify and locate guidance on hazardous chemical disposal

Generally at SNL, Members of the Workforce respond to what is called an "incidental release" or small spill. The term "incidental release" comes from the OSHA Hazardous Waste and Emergency Response (HAZWOPER) regulation which defines an incidental release as one in which "the substance can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area."

- Chapter 15 of the SNL ES&H Manual describes the required and recommended actions to be taken by Members of the Workforce when an emergency condition is observed or experienced at SNL.
- Access Chapter 15 using the link on the right and bookmark it in your web-browser.
- Additionally, these types of events may need to be reported via the SNL OOPs reporting process.

### ***SNL Non - Emergency Contacts***

Members of the Workforce generating a small spill may clean it up unless they lack the training or equipment, or they do not feel comfortable.

Advice or assistance may be requested by contacting the SNL non-emergency hotline

### ***SNL Emergency Contacts***

If human health or the environment is threatened during small spills, Members of the Workforce should call the **emergency number**.

- At SNL/NM the number is 911, or 844-0911 if you are using a cellular phone.



- At SNL/CA the number is 911 or 294-2222 (cellular)
- At SNL/TTR the number is 911
- At SNL/KTF the number is 335-5611 or 0

### ***SNL Small Chemical Spill Cleanup***

When Members of the Workforce determine that they will be responsible for small chemical spill clean-up in their work area, the following should be considered:

- Types or classes of chemical hazards that may be spilled: for example, corrosives, oxidizers, and solvents. The state of the chemical substance, solid or liquid, also should be considered.
- The potential health hazard and physical hazard of the chemical substance. Consult the material safety data sheet (MSDS) or the Division Customer Support Team Industrial Hygienist if uncertain about the health or physical hazards.
- Types of spill control media that will be procured and used for the classes of chemicals present. Compatibility of the spill control media with classes of chemicals.
- Who will maintain a spill kit inventory
- Procedures to be followed in the event of a spill such as evacuation or request for assistance.
- Personal protective equipment and hygiene practices
- Immediate control measures that will be taken, such as:
  - turn off flammable or other energy sources,
  - emergency ventilation turned on,
  - placement of barrier materials,
  - barricading the laboratory or work area

### ***Required Emergency Equipment***

All organizations with a potential for spills shall have the following appropriate equipment available:

- Personal protective equipment
- Spill response equipment. (Spill response equipment may include sufficient and compatible absorbents and neutralizers, plastic buckets with lids, 6 mil plastic bags, trays or shovels, and brooms.)



## ***Reporting Spills of Hazardous Materials***

Personnel shall report small spills of hazardous materials as follows:

### **Reporting Small Spills**

<b>SNL Site</b>	<b>Spill Quantity</b>	<b>Report To</b>
NM, TTR, KTF, CA	Less than one pound solid or one pint liquid	Manager

- Note that certain spills such as chemical substances on the extremely hazardous chemical list or that enter a drain are reportable, regardless of quantity.
- If uncertain about the reportability of a small spill, contact the Environmental Protection representative for your Division.
- Contact your manager for additional reporting requirements.

Personnel shall report large spills of hazardous materials as follows:

### **Reporting Large Spills**

Greater than or equal to one pound solid or one pint liquid. Any gas leak.

<b>SNL Site</b>	<b>Report To</b>
NM	<b>Emergency:</b> 911 (844-0911 for cellular phones) <b>Non-Emergency:</b> 311 (844-0311 for cellular phones)
CA	<b>Emergency:</b> 911 (294-2222 for cellular phones) <b>Non-emergency:</b> 311 (294-2300 for cellular phones)
TTR	<b>Emergency:</b> 911 <b>Non-Emergency:</b> 295-8285
KTF	<b>Emergency:</b> 335-5611

**Non-Emergency: 335-5611**

- For non-emergency large spills follow the SNL OOPs reporting process
- If human life or the environment is threatened, contact your emergency personnel and your Division Environmental Protection Representative. If you need assistance in reporting the spill, contact your Environmental Protection subject-matter expert (SME).
- Contact your manager for additional reporting requirements.

***Handling of Chemical Waste***

All spilled material, absorbents, neutralizers, and contaminated personal protective equipment shall be handled as chemical waste.

- Follow the requirements for containment, labeling, storage, and disposal request specified in Chapter 19, Section A, "Hazardous Waste Management"
- Access Chapter 19 using the link on the right and bookmark it in your web-browser

***SNL Additional Training***

Personnel who routinely handle chemicals in their work activities and, therefore, may clean up a small spill, shall also be knowledgeable about the properties of the spilled material. Completion of this course and your site-specific training with your manager is required. Other required training may be necessary depending on the chemical hazards, including but not limited to:

- Respirator Training - RSP215, RSP217
- Beryllium Site Specific Training - BEA101
- Hazardous Waste Generator - ENV112
- If biological hazards may be released with chemical substances - Biosafety Training - BIO105



## **Module 05 Managers Module**

The ES&H Manual, Chapter 2 describes the elements of the SNL Integrated Safety Management System. Section 2C states:

Managers shall:

- Provide the means for Members of the Workforce under their direction to have the training and necessary qualifications for working effectively and safely
- Identify appropriate training requirements and qualifications for Members of the Workforce under their direction.
- Prohibit Members of the Workforce under their direction from participating in any Sandia activities unless they are properly trained and qualified or adequately escorted.

Upon completion of this module you will be able to...

- Recognize your responsibilities in providing employees with information and training on hazardous chemicals in their work area
- Identify the requirements for ensuring exposure limits to hazardous chemicals are controlled
- Identify additional provisions for employees who work with particularly hazardous substances
- Recognize additional provisions for ototoxic chemicals
- Identify your responsibilities concerning labeling, Material Safety Data Sheets, and Technical work documents
- Identify your responsibilities when hazardous chemicals are manufactured, distributed, and imported

### ***General Information and Training***

Managers shall be responsible for providing Members of the Workforce with information and training on hazardous chemicals in their work area:

- At the time of their initial assignment to a work area where hazardous chemicals are present.
- Prior to assignments involving new exposure situations.

### ***Information***

Managers shall be responsible for ensuring that Members of the Workforce who use hazardous chemicals are provided with the following site-specific information:



- Location and availability of SNL's Chemical Hygiene Plan (CHP).
- The contents and requirements of the OSHA Laboratory Standard.
- The permissible exposure limits (PEL) for OSHA regulated chemical substances or recommended exposure limits for hazardous chemicals where there is no applicable OSHA PEL.
- Location and availability of the chemical inventory and corresponding material safety data sheets (MSDSs) for their work area.
- The signs and symptoms associated with exposures to hazardous chemicals used in the laboratory.

### ***Training***

Managers shall be responsible for ensuring that Members of the Workforce who use hazardous chemicals are provided with the following site-specific training:

- The methods and observations that may be used to detect the presence or release of a hazardous chemical.
- The physical and health hazards of chemicals in the work area.
- The measures employees can take to protect themselves from chemical hazards.

### ***Occupational Exposure to Hazardous Chemicals in Laboratories***

Managers of Members of the Workforce who engage in the laboratory use of hazardous chemical shall be responsible for ensuring that:

- Physical hazards and health hazards associated with hazardous chemicals used in laboratory operations have been identified, evaluated, and controlled.
- Members of the Workforce exposure to hazardous chemicals is controlled to ensure that it does not exceed the OSHA Permissible Exposure Limits (PELs), DOE Action Levels, or ACGIH Threshold Limit Values (TLVs). Managers shall determine and implement control measures based on hazard evaluations, which may include monitoring and/or consultation with their Division CST.

Managers of Members of the Workforce who engage in the laboratory use of hazardous chemical shall be responsible for ensuring that:

- They review and approve laboratory operations, procedures, or activities whenever a new chemical or change in process is introduced which creates a potential health hazard to Members of the Workforce and which



has not been evaluated by cognizant Members of the Workforce and/or their Division CST.

- Engineering Controls such as fume hoods and other protective equipment such as eyewashes, safety showers, and personal protective equipment (PPE) are functioning properly and used accordingly:
  - Section 6P, "Local Exhaust Ventilation (LEV)"
  - Section 6M, "Safety Showers and Eyewashes"
  - Section 4L, "Personal Protective Equipment (PPE)," and
  - Section 6C, "Respiratory Protection"
- Members of the Workforce understand and comply with SNL's Chemical Hygiene Plan (CHP) as described in this section and 29 CFR 1910.1450 (and its appendices).

Managers of Members of the Workforce who engage in the laboratory use of hazardous chemicals shall be responsible for ensuring that additional provisions for personnel protection are made for those who work with particularly hazardous substances which include select carcinogens, reproductive toxins, and substances which have a high degree of acute toxicity. These provisions are:

- A designated area is established where work with a particularly hazardous substance may be conducted, and that the designated area is posted and its boundaries clearly identifiable while the particularly hazardous substance is used.
- Decontamination procedures commensurate with the level of contamination are implemented when appropriate and prior to un-designating a designated area.
- When feasible, containment devices (e.g., fume hoods, glove boxes) are used.
- Procedures for safe removal of contaminated waste are developed and implemented



Additional provisions for hearing conservation are made for those who are potentially exposed to ototoxic chemicals.

These provisions are:

- Potential exposure is evaluated to determine if Members of the Workforce are exposed at 20% or more of the ACGIH Threshold Limit Value (TLV) for ototoxic chemicals.
- Members of the Workforce who are exposed at 20% or more of the ACGIH TLV for ototoxic chemicals are enrolled in the SNL Hearing Conservation Program to monitor for any potential adverse effects in hearing.
- Sandia Health Services and the industrial hygiene representative on the Division CST are notified regarding Members of the Workforce who are potentially exposed to ototoxic chemicals and high-noise or high ultrasound levels for potential synergistic effects on the organs or nerves involved in hearing or balance.
- The appropriate Division CST is contacted regarding Members of the Workforce who work with ototoxic chemicals in conjunction with high-noise or high ultrasound level hazards.

### ***Labeling and Material Safety Data Sheets***

Managers shall be responsible for ensuring that:

- Labels on incoming containers of hazardous chemicals are not removed or defaced.
- Any material safety data sheets (MSDSs) that are received with incoming shipments of hazardous chemicals are maintained and are readily accessible to laboratory Members of the Workforce.

**Note:** Additional requirements for obtaining or developing MSDSs apply when chemicals are manufactured, distributed, or imported by Members of the Workforce.

### ***Technical Work Documents***

Managers shall be responsible for ensuring that technical work documents (TWDs) (e.g., SOPs and OPs) that describe safety and health considerations are developed and followed if laboratory work involves the use of hazardous chemicals, including particularly hazardous substances.



### ***Manufacture, Distribution and Importation of Hazardous Chemicals***

Managers where hazardous chemicals are developed in the laboratory or imported into the laboratory shall be responsible for ensuring that Members of the Workforce understand and comply with additional requirements as defined in the SNL ES&H Manual, Section 6D, "Hazard Communication Standard, and in Attachment 6D-1 "Manufacture, Distribution, and Import of Hazardous Chemicals."

Managers of activities where chemicals are manufactured, distributed, or imported shall be responsible for ensuring that regulations regarding the import and export of chemicals that are contained in the Environmental Protection Agency's Toxic Substances Control Act (TSCA) also are followed. Section 6S of the ES&H Manual describes SNL's TSCA requirements and responsibilities.



## Module 06 Next Steps

To complete your training you must:

- Print the site specific form, LAB103
- Complete the final test
- Print the certification of course completion

Once you have successfully completed the test, take the site specific form (LAB103) and your LAB100 certificate of completion to your Manager. When you and your manager have completed your site specific training, send or take the form to your training coordinator.

If you are unable to pass the test, you will need to retake the course before you can begin your site specific training. Study the objectives closely when you retake the course.

Below are the learning objectives that were covered in this course:

### **Module 1**

- Recognize Sandia's use of signs to communicate the hazards in your work area
- Recognize health and physical hazards of chemicals and the terms associated with them
- Identify the hazards associated with working with Beryllium
- Identify the requirements of chemical labeling
- Identify methods used to detect hazardous chemicals
- Recognize signs and symptoms associated with exposure to hazardous chemicals

### **Module 2**

- Identify and locate the list of the hazardous chemicals present in your SNL workplace using an identity that is referenced on the appropriate MSDS
- Identify and locate Material Safety Data Sheets (MSDSs) for the hazardous chemicals present in your SNL workplace
- Recognize the sections of the MSDS that are important for your safety whenever you work with a new chemical
- Correctly maintain the CIS when purchasing new chemicals



### ***Module 3***

- Identify and locate Sandia's Chemical Hygiene Plan
- Recognize the additional protective measures that are required for handling particularly hazardous substances
- Define an occupational exposure limit
- Identify the requirements for working with chemicals that are regulated under the OSHA expanded health standards
- Recognize when a Technical Work Document (TWD) is required when working with hazardous chemicals
- Identify the requirements that must be followed when chemicals are developed for another user outside of the Laboratory
- Locate Sandia's Good Laboratory Practices
- Recognize safe handling, storage, and disposal procedures described in your laboratory's TWD

### ***Module 4***

- Identify the SNL emergency number to call when you need help with a chemical spill
- Identify who to contact when you may have a reportable spill
- Identify the quantity of material that represents a reportable spill
- Identify and locate guidance on hazardous chemical disposal

These objectives for Managers at SNL were also covered:

### ***Module 5 — Manager's Module***

- Recognize your responsibilities in providing employees with information and training on hazardous chemicals in their work area
- Identify the requirements for ensuring exposure limits to hazardous chemicals are controlled
- Identify additional provisions for employees who work with particularly hazardous substances
- Recognize additional provisions for ototoxic chemicals
- Identify your responsibilities concerning labeling, Material Safety Data Sheets, and Technical work documents
- Identify your responsibilities when hazardous chemicals are manufactured, distributed, and imported



## Module 6 Question

1. After you complete this course, you must
    1. Print LAB103 - Laboratory Standard Information and Training Completion Worksheet.
    2. Take the Worksheet to your Manager (or designee) who will review with you the site-specific activities for your job.
    3. Ensure that the completed Worksheet is sent to your Training Coordinator, who will enter your LAB103 completion into TEDS.
- a) True
- b) False

## Module 6 Answer Key:

1. a) True



## LAB100 Final Test

Name \_\_\_\_\_ Org. \_\_\_\_\_ Date \_\_\_\_\_

*An ES&H Completion Record Form with Project/Task and Final Test for the LAB100 should be faxed to the Course Manager at 284-2873 or mailed to MS-0653 for grading and entering into TEDs.*

1. **What hazard is indicated by a NFPA warning label when it has a “0” in the red diamond?**
  - a) This chemical has the lowest rating for reactivity.
  - b) This chemical has the lowest rating for a fire hazard.
  - c) This chemical has no specific hazard rating.
  - d) This chemical has the lowest health hazard rating.
2. **Which of the following is generally considered a health effect of acute exposure to hazardous chemicals?**
  - a) Cancer
  - b) Liver damage
  - c) Asphyxiation
3. **Exposure to beryllium particles can cause:**
  - a) Lesions and wart-like bumps
  - b) Chronic beryllium disease or CBD
  - c) Damage to organs such as the liver, kidneys, and heart
  - d) All of the above
4. **Which of the following is true concerning warning labels?**
  - a) With few exceptions, labels are not required on containers being transported from one location to another.
  - b) Labels may be removed from containers stored for less than one week.
  - c) Labels on containers being transported must contain at a minimum the name of the manufacturer.
  - d) With few exceptions, labels are required on all containers, both used in the workplace and those being transported.
5. **The release of some chemicals may be observed by the visible dispersion of airborne particles, fumes, or mist. What is another method that can be used to detect the presence or release of hazardous chemicals**
  - a) Air monitoring
  - b) Odor
  - c) Both of the above



6. Which of the following health problems would be considered chronic, or one that results from repeated or long-term exposure to hazardous chemicals?
- Dizziness
  - Asphyxiation
  - Heart damage
7. The SNL Chemical Information System (CIS) contains:
- A chemical's product name, location and quantity
  - Material Safety Data Sheets (MSDSs)
  - Responsible person for a chemical
  - All of the above
8. The MSDS lists health effects and safe exposure limits on chemicals found in the lab. It also gives you information on which of the following?
- How to create a chemical labeling system
  - What a chemical's main entry route into the body is
  - How to remove chemical stains from clothing
  - All of the above
9. Where would you look in the MSDS for clear advice about how to treat exposure to a hazardous chemical?
- Composition information on Ingredients - Section 2
  - Hazards Identification - Section 3
  - First Aid Measures - Section 4
  - Accidental Release Measures - Section 6
10. When a new chemical is purchased, you must ensure:
- The manufacturer is licensed to sell that particular chemical
  - A tracking barcode label is assigned to the chemical
  - To remove the chemical label and store correctly
  - All of the above
11. OSHA's Lab Standard requires the development and implementation of \_\_\_\_\_ to protect workers from hazardous chemical exposure in the laboratory.
- A Laboratory Safety Guide
  - Container warning labels
  - A Chemical Hygiene Plan
  - All of the above
12. Additional employee protective measures, such as signage, fume hoods, etc. must be put into effect when working with:
- Select carcinogens or reproductive toxins
  - Reactive chemicals
  - Corrosive chemicals
  - All of the above



**13. An Occupational Exposure Limit (OEL) is defined as:**

- a) Maximum time a person can work with a chemical before taking a break
- b) The concentration of a chemical that is allowable over a specific time period such as an 8-hour work day
- c) Preferred experience level for new employees
- d) Arbitrary time that OSHA will allow workers to be exposed to a chemical before being transferred to another job

**14. Technical Work Documents (TWDs) are to inform employees of:**

- a) The safety and health considerations involving the use of hazardous chemicals in their work area
- b) How to develop warning labels for hazardous chemicals
- c) Both of the above

**15. Aside from labeling correctly, what else must be done when developing chemicals for another user outside of the Laboratory?**

- a) A material safety data sheet (MSDS) must be prepared
- b) Place chemical in a clear, water-tight container
- c) Both of the above

**16. SNL has incorporated National Safety Council's *Good Laboratory Practices* to ensure:**

- a) Safe work practices are used when working with hazardous chemicals
- b) Local exhaust ventilation (LEV) is used for operations which might result in release of toxic chemical vapors
- c) Appropriate gloves and eye protection or other personal protective equipment are worn
- d) All of the above

**17. Where can you find your laboratory's safe handling procedures?**

- a) Your laboratory's technical work documents (TWDs)
- b) OSHA Laboratory Standard 29 Code of Federal Regulations (CFR) 1910.1450
- c) DOE Order 110.1A
- d) None of the above

**18. If human health or the environment is threatened during a small spill, you should immediately call:**

- a) SNL Non-Emergency Hotline
- b) SNL Emergency and your manager
- c) ES&H Team Members
- d) None of the above



**19. Chemical spills that are less than one pound solid or one pint liquid are reported to:**

- a) SNL Emergency
- b) The OSHA Representative in your area
- c) Your Manager
- d) None of the above

**20. If human life or the environment is threatened by a large spill, who should be contacted?**

- a) DOE's OSHA representative and/or the Federal Bureau of Investigation (FBI)
- b) SNL Emergency and your manager
- c) Both of the above

**21. Where can you find information on disposing hazardous waste?**

- a) DOE Order 110.1A
- b) OSHA Laboratory Standard 29 Code of Federal Regulations (CFR) 1910.1450
- c) ES&H Manual, Chapter 19, Section A

**22. Managers must advise employees who work with hazardous chemicals with what site specific information?**

- a) Location and availability of SNL's Chemical Hygiene Plan
- b) Signs and symptoms associated with exposures to hazardous chemicals in their laboratory
- c) Location and availability of the chemical inventory system and the MSDS library
- d) All of the above

**23. Managers must ensure that exposure to hazardous chemicals is controlled so that it does not exceed:**

- a) The ACGIH Threshold Limit Values (TLVs)
- b) OSHA Permissible Exposure Limits (PELs)
- c) Either the ACGIH TLV or the OSHA PEL, whichever is more protective.

**24. When are additional provisions for personnel protection necessary?**

- a) For employees who work with particularly hazardous substances
- b) For employees who work with consumer products
- c) Both of the above

**25. An evaluation is initiated to determine if employees are exposed at a greater than what percent of the ACGIH Threshold Limit Value (TLV)?**

- a) 10%
- b) 20%
- c) 30%

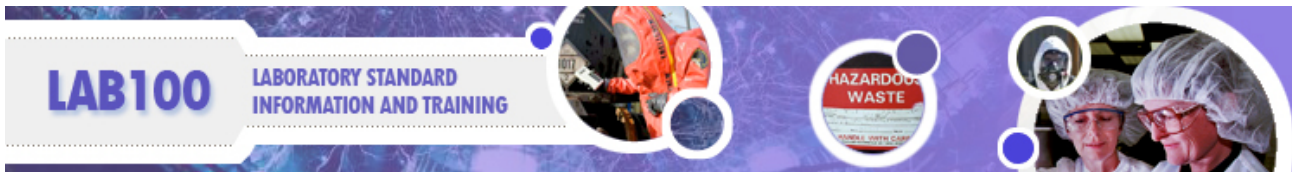


**26. Managers must ensure labels on incoming containers of hazardous chemicals are:**

- a) Approved by procurement
- b) Not removed or defaced
- c) Both of the above

**27. Where can the additional requirements be found regarding developing or importing hazardous chemicals?**

- a) DOE Order 110.1A
- b) Section 6D (Hazard Communication) and Section 6S (TSCA) of the ES&H Manual
- c) Both of the above



SF 4555-TCR # (8-2002) Supersedes (8-97) issue

## UCI ES&H TRAINING COMPLETION RECORD

Use this form for training completion information. This form must be initialed by attendees and certified by the instructor or responsible manager.

Course No. \_\_\_\_\_ Course Title: \_\_\_\_\_

Vendor/Instructor: \_\_\_\_\_

Start Date: \_\_\_\_\_ End Date: \_\_\_\_\_ Length: \_\_\_\_\_ Hrs.

<i>Social Security No.</i>	<i>Name (Please Print)</i>	<i>Org.</i>	<i>Initials</i>

I certify that the above attendees have completed this training and have had the opportunity to ask questions.

Certified By: \_\_\_\_\_



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## UCI



## LAB100 Feedback Form

Customer feedback is important to us. Please complete the evaluation form below and forward it to the Berta Armijo-Chavez, MS0653, and fax number: (505) 844-2748.

Rate on a scale of 1- 5 (with 1= poor and 5 =excellent):

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| • The ease of using of this learning tool and/or test?  | 1 | 2 | 3 | 4 | 5 |
| • The organization of information presented?  | 1 | 2 | 3 | 4 | 5 |
| • The amount of information presented?  | 1 | 2 | 3 | 4 | 5 |
| • The usefulness of the information presented?  | 1 | 2 | 3 | 4 | 5 |
| • Your level of knowledge related to this topic<br>BEFORE using this learning tool and/or test? | 1 | 2 | 3 | 4 | 5 |
| • Your level of knowledge related to this topic<br>AFTER using this learning tool and/or test?  | 1 | 2 | 3 | 4 | 5 |
| • The overall quality of this learning tool and/or test?  | 1 | 2 | 3 | 4 | 5 |

Fill in the blanks:

- What was most valuable about this learning tool or test?

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- What information needs to be corrected, inserted, removed, or updated?

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- What could be done to improve or enhance this learning tool or test?

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## LAB 103 - Laboratory Standard Information

The LAB103, which is the Site-Specific Worksheet and Phase II of LAB100, should be printed out. Students will need to take that worksheet to their Manager or Manager-designee. When the student and their manager have completed the LAB103 site-specific training, they need to send or take the form to their training coordinator. Training Coordinators will be responsible for entering the LAB103 completions into TEDs.

The following information is taken directly from Chapter 6E of the ES&H Manual. For further information, please review the entire chapter of the Manual: Chapter 6E, Laboratory Standard -- Chemical Hygiene Plan:



**Managers** shall be responsible for providing Members of the Workforce with appropriate information and training to ensure that they are apprised of the hazards of chemicals present in their work area:

- At the time of their initial assignment.
- Prior to assignments involving new exposure situations.

*Site-Specific training (specific to the workers assigned area) is required to be provided by the workers manager or their managers' designee, according to the following:*

**Managers** shall be responsible for ensuring that Members of the Workforce using hazardous chemicals are informed of the following:

- Contents of 29 Code of Federal Regulations (CFR) 1910.1450, Occupational Exposure to Hazardous Chemicals in Laboratories (commonly referred to as the OSHA "Laboratory Standard"), and all its appendices. The link to the OSHA Laboratory Standard is:
- [http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=10106](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10106).
- Location and availability of SNL's Chemical Hygiene Plan (CHP), which is Chapter 6E of the SNL ES&H Manual. <http://www-irn.sandia.gov/corpdata/esh-manuals/mn471001/m001toc.htm#manual%20contents>
- Applicable occupational exposure limits, including OSHA Permissible Exposure Limits (PELs), American Conference of Governmental Industrial Hygienists (ACGIH), Threshold Limit Values (TLVs), and the Department of Energy (DOE) Beryllium Action Level.
- Signs and symptoms associated with exposure to hazardous chemicals used in the laboratory.

- Location and availability of reference material (e.g., material safety data sheet [MSDS]) on hazards, safe handling, storage, and disposal of hazardous chemicals found in the laboratory.

**Note:** Managers should contact their Division ES&H Team for assistance in providing LAB103 Site-Specific training. This **REQUIRED site-specific training worksheet is attached** for your use in completing this training. Complete the form and return it to your Training Coordinator for entering into TEDs.

**For complete information on Manager responsibilities, refer to Section 6E - Laboratory Standard -- Chemical Hygiene Plan in the ES&H Manual: Section 6E**

## LAB103 Site-Specific Worksheet

Trainee: \_\_\_\_\_ Dept. Number: \_\_\_\_\_ Initials: \_\_\_\_\_

Manager (or designee): \_\_\_\_\_ Date Completion: \_\_\_\_\_

Space is provided for the manager (or his or her designee) to initial each of the six LAB103 activities signifying completion of the activity. When all six activities are completed, have the Manager or designee sign and date, and give to your Training Coordinator for entering into TEDs.

### **LAB103 Activity #1:** Trainee has completed LAB100, Part I, LABORATORY STANDARD INFORMATION TRAINING

Manager's initials: \_\_\_\_\_

Date: \_\_\_\_\_

### **LAB103 Activity #2:** Trainee has been informed of the physical and health hazards of the chemicals associated with his or her job assignments.

Manager's initials: \_\_\_\_\_

Date: \_\_\_\_\_

### **LAB103 Activity #3:** Trainee has been informed of the signage, postings, and labeling used to identify chemical hazards in his or her assigned work area(s).

Manager's initials: \_\_\_\_\_

Date: \_\_\_\_\_

### **LAB103 Activity #4:** Trainee knows how to obtain written information about the hazards, exposure limits, safe handling, storage, and disposal of hazardous chemicals used in his or her laboratory. This written information may be in the form of MSDSs.

Manager's initials: \_\_\_\_\_

Date: \_\_\_\_\_

**LAB103 Activity #5:** Trainee has been instructed in the methods used to protect him or her from chemical hazards in the laboratory, including proper work practices, personal protective equipment, engineering controls, and emergency procedures.

Manager's initials: \_\_\_\_\_

Date: \_\_\_\_\_

**LAB103 Activity #6:** Trainee has been trained in the methods and observations that may be used in their work area to detect the presence or release of a chemical (continuous air monitoring, alarms, odor or visual appearance).

Manager's initials: \_\_\_\_\_

Date: \_\_\_\_\_

**Complete and return within 30 days.**